

REMARKS

In the office action mailed September 24, 2004, Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Mattaway et al., U.S. Patent No. 6,185,184 ("Mattaway '184") in view of Zhang et al., U.S. Patent No. 6,381,646 ("Zhang '646").

5 After a careful review of the pending claims and various portions of the cited references, Applicants respectively request reconsideration in view of the following remarks.

I. APPLICANTS' PRESENTLY CLAIMED INVENTION

Applicant's presently claimed invention is generally directed to a method for using multiple network addresses for interprocess communication through a common physical layer.
10 (emphasis added). For example, and as Applicant's describe with reference to Figure 5, Figure 5 represents a flow diagram illustrating a method 130 for using multiple network addresses for interprocess communication through a common physical layer.

The method 130 includes creating a first interprocess communication data structure associated with a first network address on a first network device 14 at step 132. The first
15 network device 14 may be the telephony device as illustrated in FIG. 1, although other types of network devices are possible and the present invention is not limited to the telephony device of FIG. 1. An example of an interprocess communication data structure associated with a network address is a socket that is assigned a new IP 58 address when it is created. A call to a "socket" function from a process may create the first socket as a data structure in memory associated with
20 the kernel of the first network device 14. For example Socket #1 108 of FIG. 4 may be created by a modified "socket" function call from Process B 84. (Applicants' Specification p. 26 line 17 – p. 27 line 4).

At step 134, a first communication is established between the first network device 14 and

a second network device 16 using the first interprocess communication data structure and the first network address. For example, the first socket may establish a connection with a target socket on the second network device 16. This may initiate a data flow between the process bound to the first socket and another process on the second network device 16 bound to the target socket. The communication may be connection oriented, such as a TCP 62 virtual connection, or connectionless, such as a UDP 60 virtual connection. The data flow may follow a modified "bind" or "connect" function call with the "socket descriptor" for the first socket. Process B 84, for example, may initiate a data flow through the data structure of Socket #1 108. The kernel associated Socket #1 108 with its own network interface 114 having the new IP 58 address @X. (Applicants' Specification p. 27 lines 8 - 17).

The first communication passes through the common physical layer for the first network device 14. As illustrated in FIG. 4, the multiple IP 58 addresses at the network layer share a common data-link and device driver 96 for the first network device 14 at its physical layer. Data flows to and from all processes 82-86 through the same physical layer interface 96. Data to or from one process 82-86 may go to one or more socket data structures 108-112. The respective network layer interface 114 for the first socket 108 encapsulates or de-capsulates the data and processes the packets through the common data-link and physical layer 96.

A second interprocess communication data structure is created at step 136. The second interprocess communication data structure is associated with a second network address on the first network device. The second network address is different from the first network address. For example, Process B 84, having already created Socket #1 108, may also create a second socket, Socket #2 110, by another modified "socket" function call. Socket #2 110 has a different IP 58 address, @Y, compared to Socket #1 108, @X, as the kernel assigns a new IP 58 address

when the process makes a modified “socket” function call. There are now two sockets on the first network device 14, and each socket is associated with a different IP 58 address. (Applicants’ Specification p. 27 line 21 – p. 28 line 13).

At step 138, a second communication is established between the first network device 14 and a third network device (not shown) using the second interprocess communication data structure and the second network address. The second socket may then establish a connection with another target socket on a third computer to provide another virtual connection. This may initiate a data flow between the process and a third process on the third network device bound to the target socket. The communication may be connection oriented, such as a TCP 62 virtual connection, or connectionless, such as a UDP 60 virtual connection. The data flow may follow a modified “bind” or “connect” function call with the “socket descriptor” for the second socket. Process B 84, for example, may initiate a data flow through the data structure of Socket #2 110. The kernel associated Socket #2 110 with its own network interface 116 having the new IP 58 address @Y. The respective network layer interface 116 for the second socket 110 encapsulates or de-encapsulates the data and processes the packets through the common data-link and physical layer 96. In this manner, a host computer, application, process, or other entity may support multiple network addresses and bind each address to a separate socket and/or a separate process. This allows a network device to communicate with other network devices using two or more network addresses. (Applicants’ Specification p. 28 line 14 – p. 28 line 7).

Such a preferred method results in a number of advantages over those systems, like the system that is apparently taught by Mattaway ‘184 or Zhang ‘646, that do not provide for multiple IP address for a single device and passing a first and a second communication through a “common physical layer.”

For example, in Applicants' presently claimed invention, more than one IP interface may map to the same physical or logical data-link device. However, each interface will only send and receive data on behalf of a related group of processes as illustrated in FIG. 4. An advantage of the present invention compared to a traditional data-link interface is that it represents an IP 58 address that is bound to a given executing instance of an application (e.g., a process or related group of processes). Such a configuration may be useful for differentiating IP 58 data traffic to or from a particular host based on something other than a transport-layer parameter such as a TCP 62 or UDP 60 port.

For example, in Internet telephony it may be advantageous for each new call to be ascribed a new IP 58 address. Calls are typically IP 58 messages exchanged between telephony devices in a virtual private network. The telephony devices may typically support multiple calls, each call being associated with a process in the telephony device. In this case, the new IP 58 address resides in a private network address space for the virtual private network. NAT tunnels the calls across the (public) Internet. Ascribing a new and unique IP 58 address to each call may ensure that the identity of the caller is hidden as the call traverses the Internet. Each call process should be associated with a respective private IP 58 address. (Applicants' Specification p. 29 lines 8 – p. 30 line 1).

Another advantage of supporting multiple IP 58 addresses is improving switching efficiency. As described above, IP 58 addresses rather than TCP 62 or UDP 60 port number may distinguish traffic for applications. In general, layer 3 (network layer) switching using IP 58 addresses is expected to be more efficient than layer 4 (transport layer) switching using TCP 62 or UDP 60 ports. Improved switching efficiency may increase the call capacity of the Internet. (Applicants' Specification p. 30 lines 3 – 7).

Yet another advantage of using multiple IP 58 addresses is to differentiate data traffic associated with different Quality of Service ("QoS"). QoS provides statistical guarantees of throughput, delay, delay variation, and packet loss. QoS is important in the transmission of Internet telephony, multimedia, and video data streams as these transmissions require a guaranteed bandwidth to function. Different applications on the same host computer may need to communicate with a separate QoS. For example, Internet telephony applications may require a constant or guaranteed bitrate QoS, whereas a web browsing application may require a basic QoS. Differentiating QoS may also improve the ability of the Internet to carry many forms of data communication simultaneously.

Edge routers (24,26) supporting QoS are required to process IP 58 packets differently depending on the QoS of the data communication. Instead of examining the internal details of an incoming IP 58 packet to determine the appropriate QoS, the edge router (24,26) may simply recognize that an IP 58 address in the header is associated with a particular QoS and process that packet accordingly. As discussed above, layer 3 switching is typically expected to be efficient. Ascribing an IP 58 address to each application may allow the IP 58 address for the application to be associated with the QoS of the application. The IP 58 address and QoS of the application may be conveyed to the edge router (24,26) to establish a layer 3 switching channel for the application. Therefore, each communication is over a virtual channel between applications associated with a particular QoS and a unique IP 58 address. (Applicants' Specification p. 30 line 8 – p. 31 line 4).

Future communication systems, however, may require a protocol stack capable of supporting multiple IP addresses in a broader sense: different processes on the same host are associated with different IP addresses on the same physical interface. Processes may request a

new IP interface with a new IP address rather than share a single IP address with all other processes. Instead of distinguishing traffic to and from processes by port numbers, the traffic may be distinguished by IP address. (Applicants' Specification, p. 3 line 18 – p. 4 line 2).

Applicants' presently pending Independent Claim 1 is generally directed to such a method for using multiple network addresses for interprocess communication through a common physical layer. For example, Independent Claim 1 expressly recites "creating a second interprocess communication data structure associated with a second network address on the first network device, wherein the second network address is different from the first network address" and "establishing a first communication between the first network device and a second network device," passing "the first communication [. . .] through the common physical layer for the first network device," and then passing a second communication "through the common physical layer for the first network device." Therefore, both the first and the second communication are passed "through the common physical layer for the first network device."

As explained more clearly below, none of the references cited in the September 24, 2004 Office Action teach or suggest, either expressly or inherently, Applicants' method for using multiple network addresses for interprocess communication through a common physical layer.

II. CLAIM REJECTIONS UNDER 35 U.S.C. §103(a)

Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mattaway et al., U.S. Patent No. 6,185,184 ("Mattaway '184") in view of Zhang et al. U.S. Patent No. 6,381,646 ("Zhang '646"). Applicants' respectively traverse.

To establish a *prima facie* case of obviousness based on the combination of the cited references, the cited references must teach or suggest all the claim limitations, and there must be some suggestion or motivation to modify the references or combine reference teachings.

(M.P.E.P. § 2142). The teaching or suggestion to make the claimed combination must be found in the cited references and not in Applicant's disclosure. (M.P.E.P. § 2142).

Applicants' respectively submit that the cited references do not teach or suggest all of the claim limitations of Independent Claim 1. The Mattaway '184 reference simply does not teach or suggest creating "a second network address on the first network device, wherein the second network address is different from the first network address" or the step of passing a first and a second communication "through the common physical layer for the first network device" as presently claimed in Applicants' pending Independent Claim 1.

Rather, Mattaway '184 appears generally directed to what Applicants illustrate in Figure 3 and what Applicants' describe as a "block diagram illustrating a typical stack implementation." (Applicants' Specification p. 6 line 6). (emphasis added). As Applicants describe, this typical stack implementation utilizes multiple sockets for use with only a single IP Address. This appears to be what Mattaway '184 teaches: a single IP address at a network layer.

It appears that the September 24, 2004 Office Action concedes that Mattaway '184 fails to teach or suggest Applicants' claimed step of "establishing a second communication between the first network device and a third network device using the second interprocess communication data structure and the second network address, wherein the second communication passes through the common physical layer for the first network device." (September 24, 2004 Office Action at p. 3).

However, the September 24, 2004 Office Action states that Zhang '646 discloses Applicants' step of "establishing a second communication between the first network device and a third network device using the second interprocess communication data structure and the second network address, wherein the second communication passes through the common physical layer

for the first network device.“ Applicants respectively traverse.

Unlike Applicants’ presently claimed invention, Zhang ‘646 appears generally directed to “managing multiple network connections from a single PPP link with partial network address translation.” (Zhang ‘646 Col. 1 lines 11-12). Zhang ‘646 explains that “PPP is commonly used
5 as the data link protocol between a user and an Internet Service Provider (ISP) or access point.” Zhang ‘646 purports that one major drawback of PPP is “that it is designed as a point to point protocol, meaning that it is designed for use between two endpoints. Therefore it is currently not possible for a user to connect to two independent endpoints simultaneously (such as an intranet and the Internet, or to two independent intranets) using a single PPP link.” (Zhang ‘646 Col. 2
10 lines 50-56).

To solve such stated concerns, Zhang ‘646 proposes a method for “making multiple network connections with only partial network address translation.” (Zhang ‘646 Col. 4 lines 48-50). Zhang ‘646 explains that this method may be “executed by a gateway.” More specifically, Zhang ‘646 emphasizes that “a gateway is a device that performs protocol conversion between
15 different types of networks or applications.” (Zhang ‘646 Col. 4 lines 48-50). Zhang ‘646 does not teach or suggest using a host computer, application, process, or other entity to support multiple network addresses and bind each such address to a separate socket and/or a separate process. Zhang ‘646, therefore, does not appear to allow a network device to communicate with other network devices using two or more network addresses, each address assigned to a separate
20 socket. (Applicants’ Specification p. 28 line 14 – p. 28 line 7).

This is also clearly illustrated in Zhang ‘646 Figures 3 and 4. Figure 3 is a “diagram illustrating the use of a gateway to couple multiple networks according to a presently preferred embodiment of the present invention.” (Zhang ‘646 Col. 3 lines 63-65). In Zhang ‘646

description of Figure 3, there is no mention of associating a first communication data structure to a first network address and associating a second communication data structure to a second network address. Therefore, there is simply no mention of creating a first socket having a first network address and a second socket having a second network address. Naturally, therefore, Zhang '646 also fails to disclose passing both the first and the second communication "through [a] common physical layer for the first network device." (See Zhang '646 Col. 55-63).

The September 24, 2004 Office Action cites various portions of Zhang '646 that allegedly disclose Applicants' expressly recited step of "establishing a second communication between the first network device and a third network device using the second interprocess communication data structure and the second network address, wherein the second communication passes through the common physical layer for the first network device." Applicants respectively traverse.

The recited portions of Zhang '646, simply appear to teach away from Applicants' presently claimed invention. For example, the September 24, 2004 Office Action relies on Zhang '646 Figure 4 and related passages as disclosing this step of Applicant's presently claimed invention. However, in Figure 4, Zhang '646 discusses "a first real network address assigned by the first network" and a "second real network address assigned by the second network." This cited portion of Zhang '646 does not teach or suggest that the first and second network address have separate associated sockets. Zhang '646 also fails to disclose that both the first and the second communication are both passed through a common physical layer of a first network device. Consequently, Zhang '646 appears to teach what Applicants' describe as a "typical IP communication process." (See Applicants' Specification at pp. 12-14 and Figure 3).

Consequently, Applicants' respectively submit that neither Mattaway '184 nor Zhang

‘646 teach or suggest creating “establishing a second communication between the first network device and a third network device using the second interprocess communication data structure and the second network address, wherein the second communication passes through the common physical layer for the first network device” as presently claimed in Applicants’ pending Independent Claim 1.

III. SUMMARY

In conclusion, it is respectfully submitted that Applicants have overcome each of the Examiner’s rejections over the cited references.

It is submitted, therefore, that all pending Claims 1 - 8 are in condition for allowance and early notice to this effect is earnestly solicited. Independent Claim 1 is allowable for the reasons stated above. The remaining pending claims 2-8 are dependent on allowable Independent Claim 1 and are therefore allowable for at least the reasons discussed with regard to Independent Claim 1.

If there are any additional matters which may be resolved through a telephone interview, the Examiner is respectfully requested to contact Applicant’s undersigned representative.

Respectfully Submitted,

Date:

3/23/05

By:



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